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ON THE VISIBLE REMAINS OF THE VITREOUS CANAL WITH A REPORT OF CASES.*

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Some apology may be needed for speaking of a subject so well known as that of the visible remains of the Canal of Cloquet. But for the past ten years it has been my good fortune to observe several typical cases of these unusual vestiges. In hospital practice I have seen several instances a year, but of no special value. In my private practice however, I have had four cases which present typical features. An account of my observations in these cases is the object of this paper.

The Canal of Cloquet is the lymph channel found in the axis of the vitreous body. Besides transmitting the lymph it also gives passage to an artery, the hyaloid, which helps to form the vascular tunic of the lens. Between the fifth month and the seventh of human fetal life, this canal and its artery disappear, the obliteration beginning at the posterior pole of the lens. In animals born blind the canal usually persists until the eighth or tenth day; while in certain animals, as the cow, all of the Ruminants, and a large number of the Rodents, it does not disappear.

At times we find the canal with its artery, in whole or in part, remaining in Man, especially when the eye is imperfectly developed, as in microphthalmic eyes. Schöbl found them frequently in twins and in triplets, though they were lost again after a week or so.

Lindsay Johnson found these rudiments in the Primates as well as in Man, and he has grouped their occurrence under three forms:

I. A hollow trumpet-shaped tube with the base at the disk and free from blood, which we speak of as the visible remains of Cloquet's Canal.

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II. A short, pulsating, cecal vessel filled with blood, springing from the central artery of the retina, and known as a persisting hyaloid artery.

III. A white, dense, fibrous cord, arising from the disk and terminating free in the vitreous, or attached to the posterior capsule of the lens by two or three threads.

Very frequently other anomalies are associated, as for instance, the persistence of pupillary membranes, iridal and chorioidal colobomata, posterior polar cataract, and deficiencies in the optic nerve. Some disturbance, doubtless, of the mesoblastic processes is the determining factor in these cases, and even in the very persistence of the lymph channel and its artery. The posterior capsular opacity is caused by the persistence of the attachment of the hyaloid at the posterior pole of the lens.

Many cases of vitreous opacities seen in healthy young subjects, whose uveal tracts present no signs of previous or existing inflammation, are doubtless instances of the retention of shreds of the canal or the artery which have not yet been dissolved in the retrogression of the fetal structures. I have conceived the "guy-ropes" in the case shown by Wm. T. Shoemaker before the Section in April, 1906, to be either shrunken branches of the artery, or membranous expansions from the canal itself.

The first case I will record is a remarkable instance of the retention of these shreds. On the day after I finished the other portions of this paper, a young man came to me for examination. In his right eye I saw suspended in the vitreous a large continuously circular opacity. In shape and appearance it reminded me of a microscopic cross section of an artery; the inner circle was sharply defined, while the outer was irregular and had fine fibers projecting from it. It rested upright directly in the axis of the vitreous, and it appeared to be anchored below by one of the fibers. When the globe was rotated briskly, the ring fell forward to a horizontal position without appreciable descent, and rose again to the upright when the eye was at rest.

My second case was seen in a man of 23, a clerk in a railway office. He was moderately myopic. Projecting some distance into the vitreous, and beyond the nasal border of the optic disk

in his right eye, was a tubular mass which appeared to be bent back upon itself, and was connected with the center of the disk by a distinct cord. In color it was pinkish, but this might have been reflected from the highly tinted fundus. It was not possible to decide with certainty that blood flowed into this tube, yet when pressure was made upon the globe the mass pulsated distinctly. It was my privilege to be given the personal case-records of the surgeon under whose care the young man had been six years previously. In them was noted, "A clubshaped mass over disk at nasal side; it waves and is probably a cysticercus." In the left eye, along the lower border of the pupil were a few strands of pupillary membrane.

My third case was that of a young woman who was markedly anemic, being in the early weeks of convalescence from an appendectomy. In her right eye was a fine tubular projection with a rounded or knobbed head extending into the posterior vitreous, opposite the center of the disk. It was impossible to trace a line connecting it with the disk; yet it rose and fell with each distinctly pronounced pulsation of the vessels.

The fourth instance is that of a youth, a worker in dentist's materials. He believes that in earlier years he had good sight in his right eye, but that after receiving a blow on that eye the sight has been reduced, and he has had much annoyance because the globe has rotated outwardly. The vision is 5/60, Snellen, and is not improved by lenses. The eye is myopic, and the pupil is larger than its fellow.

In the superior nasal quadrant of the lens is a dense opacity occupying the posterior capsular cortex and extending to the circumference. From this opacity a few strands of deep white fibers extend into the vitreous, and are joined to the fringed ends of a large tube of grayish tissue which undulates in two curves back to the position of the central vessels. The disk is a large vertical ellipse, of about twice the diameter of an ordinary nerve head, and is without the usual lamina cribrosa, but appears to contain a deep cavity. The vessels disperse radially as though from the depths of the nerve where they had divided before being distributed to the surface of the disk. It is a form of coloboma of the optic nerve, and the tube appears to come from the center of the funnel. There are marks of

stretching and atrophy of the retina and chorioid, but these I believe to be those of myopia only.

Persistence of the entire artery as a blood carrying vessel must indeed be one of the rarest of congenital anomalies. Yet I have an imperfect recollection of seeing an instance of it in 1894 while resident surgeon at Wills Hospital. Notes were unfortunately not made, but I remember that I was warned to be on the watch for another instance of it.

More than once I have seen Johnson's second group, for my cases two and three are examples of it. As illustrating Johnson's third group, is my fourth case; and through the courtesy of Dr. Clarence Franklin, I am allowed to detail briefly a case in a man under his care. Dr. Franklin's patient is an expert mechanical engineer whose eyesight is perfect, yet in each eye there is a persistent hyaloid artery. On the posterior capsule of each lens is a nodule or patch which is the point of attachment of a twisted fibrous cord which arises at the bifurcation of the central artery on the disk.

In Dr. Franklin's case the patient experiences no difficulty whatsoever, while in my own cases the acuity of vision was not appreciably reduced except in number four, and yet it cannot be asserted that the tube alone interfered with his sight.

We may conclude, therefore, by stating that the effect of the presence of these fetal structures upon the vision varies, as might be expected, and depends upon their position and size, and whether or not they are associated with deficiencies in other portions of the globe.

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